Wylde, V. (2015). *CORR* Insights®: Abnormal quantitative sensory testing is associated with persistent pain one year after TKA. *Clinical Orthopaedics and Related Research*, *473*(1), 255-257. https://doi.org/10.1007/s11999-014-4023-x

CORR Insights®: Abnormal Quantitative Sensory Testing is Associated With Persistent Pain One Year After TKA

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This CORR Insights® *is a commentary on the article* "Abnormal Quantitative Sensory Testing is Associated With Persistent Pain One Year After TKA" *by Wright and colleagues available at:* DOI: 10.1007/s11999-014-3990-2.

This *CORR* Insights® comment refers to the article available at DOI: 10.1007/s11999-014-3990-2.

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Where Are We Now?

Although total knee replacement is a successful operation for many patients, approximately 20% of patients experience chronic postsurgical pain [3]. This can be defined as pain that persists beyond normal tissue healing, which in the context of knee replacement, can be up to 12 months after surgery. Research to investigate mechanisms and factors that contribute to persistent pain for some patients is of paramount importance to facilitate a move towards prevention or better management and treatment for patients with chronic postsurgical pain.

The application of Quantitative Sensory Testing (QST) to understand suboptimal postoperative pain outcomes is an area that is attracting increasing attention in both orthopaedics and other surgical specialties. QST is a non-invasive test which evaluates participants' responses to quantified external stimuli that are administered under standardized conditions. QST can utilize an array of different modalities, such as a pressure and thermal stimuli, to detect and measure somatosensory abnormalities. Several studies have demonstrated that many patients with osteoarthritis display a range of somatosensory abnormalities, such as widespread pain sensitisation [2, 9, 11]. These preoperative changes in central pain processing, initiated due to chronic nociceptive input into the nervous system from the damaged joint, could be a contributing factor to chronic postsurgical pain. In the current cross-sectional study, the authors compared a range of QST findings from patients with no pain after knee replacement and patients with moderate-to-severe pain at least 12 months after knee replacement. This comparison revealed that localized and widespread pressure and cold hyperalgesia were associated with the presence of pain after knee replacement.

Where Do We Need To Go?

The application of QST to patients with chronic pain after knee replacement is still a nascent field of research. Previous QST studies conducted with patients before and after joint

replacement surgery have found that pre-operative somatosensory abnormalities normalize after surgery [1, 4-6]. However, these studies were done in small numbers of patients, the majority of whom reported good postoperative pain relief. The current study adds to the knowledge in this area by providing evidence that patients with chronic pain after primary knee replacement demonstrate evidence of widespread hyperalgesia. These findings support those from a previous study of patients with chronic pain after revision knee replacement [8].

The evidence emerging from this field of research is that some patients undergoing joint replacement have pain perception abnormalities prior to surgery [9]. Research, including from the current study, suggests that patients with chronic post-surgical pain also display similar abnormalities. However, it is not yet clear whether pre-operative abnormalities are a risk factor for a poor outcome after surgery. Therefore, the next step is to evaluate whether these preoperative pain perception abnormalities are predictive of the development of chronic postsurgical pain. Small exploratory studies have found an association between preoperative QST and chronic pain after knee replacement [7, 10], but larger studies are needed to confirm these preliminary findings. This could elucidate potential mechanisms for a poor pain outcome after joint replacement, in addition to determining whether QST could be a useful tool to preoperatively identify patients at risk of a poor pain outcome after surgery.

How Do We Get There?

Cross-sectional studies can provide useful and insightful data to develop hypotheses to test in further research. However, as the authors of the current study acknowledge, they are limited because their temporal nature precludes the ability to draw conclusions about causality. The limited number of longitudinal studies on this topic to date have been small and exploratory [7, 10]. Large longitudinal studies are now needed to evaluate whether preoperative QST measurements can identify patients at high risk of a poor pain outcome after surgery, accounting for other factors known to be associated with chronic post-surgical pain.

Prospective cohort studies that capture data on chronic pain after knee replacement, which affects only one in five patients, are challenging to conduct because large samples needed to ensure adequate numbers of patients with the outcome of interest. However, these studies are central to furthering our understanding and treatment of chronic postsurgical pain.

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